REMARKS

Claims 1 to 30 remain in the application.

Claims 7 to 9 have been amended consonant with the Examiner's suggestion and should therefore now be deemed in condition for allowance.

The present invention concerns a method for performing network planning used to design telecommunications networks and deploying equipment in such networks. Specifically, the method is useful for placing equipment in a manner to serve forcasted demand for services within a geographic area.

Claims 1-6 and 10-12 stand rejected under 35 USC 103(a) as being unpatentable over U.S. Patent No. 5,974,127 (Wernli et al), Applicants' admitted prior art, and further in view of U.S. Patent No. 6,393,290 (Ufongene).

The method begins by determining a planning area. A determination is then made of a service demand forecast within the planning area based on demographic data for the planning area. The demographically-driven demand forecast is then used as input data to generate a deployment plan or layout model/network architecture. The claimed invention relies on a tree shaped network and distance based constraints in order to provide an optimal deployment plan.

The tree structure is a significant because it allows for expansion of the network in response to forecast customer demand.

While other network structures may have been suggested, a hub and spoke model, for example, is not as adaptable to network growth. The shortcomings of a hub and spoke model are described in the application at page 3 lines 8 to 18 which reads as follows: "For example, a prior art approach comprises placing DSLAMs at the hubs of a hub and spoke model. By this deployment model the hubs are the host locations and correspond to either a corporate Local Area Network (LAN) or Internet Service Provider location. The subscribers are then connected via the spokes to the host location. This method or model for deployment is under–inclusive in that there may be many subscribers "beyond the reach of the host/hub" who desire DSL service. In addition, this method unnecessarily ties demand to the anticipated needs of large corporations and ISPs (Internet Service Providers). More importantly, deploying equipment in accordance with this methodology does not take into account future growth both within and outside the reach of the hub and is in no way related to a customer demand forecast."

Accordingly, the choice of a tree structure is not an arbitrary selection, but rather is based on the practical aspects of enabling planning for forecast growth of a network. Moreover, there are inherent distance constraints in broadband networks which necessitate the deployment of equipment, such as a DSLAM, at intervals along the path from a central station to a subscriber. A tree structure network facilitates a network design having distance constraints.

Applicants at page 2 lines 14 to 19 of the specification say "DSL may be viewed as being overlaid on an existing copper network within a single wire center. The existing copper network defines how subscribers are connected to the central office and dictates where DSLAMs can be placed. This network is logically a tree connecting subscribers to the central office. Typically, DSLAMs can be placed at the central office and suitable cross-connect locations in the field." Providing DSL services starting from an existing copper network is not Applicants' claimed invention in Claim 1. Rather, the claimed invention is determining a baseline architecture planning area having a tree structure, determining a forecast of DSL service within the baseline planning area using demographic data for the

planning area and determining from the forecast, sites in the tree structure for deployment of equipment minimizing cost and satisfying design constraints.

Referring now to the art of record, Wernli et al (U.S. Patent No. 5,974,127) discloses a method for planning a telecommunications network based on future characteristics of a plurality of loops, a plurality of transports, the switches, and the common systems. As noted by the Examiner, Wernli et al is silent as to the network configuration and also fails to disclose or even suggest the use of demographic data in determining future demand. While a network may be deployed in different configurations, Applicants' claimed invention reliance on a tree structure results in an optimal solution of the equipment deployment problem with distance based constraints. Geo-spatial data, such as from a GIS, is analyzed in providing an optimal solution to the problem. For the reasons mentioned above both the use of a tree structure network and the use of geo-spatial demographic data are important aspects of Applicants' claimed invention.

Ufongene is cited by the Examiner for the showing that demographics are used in determining future network architecture. However, Ufongene discloses "demographic parameters such as serving area size [A_{co}] and building density [D_b], and marketing parameters, such as service penetration rates [δ], i.e., the percentage of potential customers expected to be served. (Column 2, lines 26-30)

Applicants use geo-referenced data layers or information, such as from GIS databases, comprising data such as: Wire Center boundary information, Central Office locations within these Wire Centers, Map of copper network within these Wire Centers, Precise location of nodes where DSLAMS might be deployed, Cable connections joining nodes, Street map for wire centers (In vector format with feature files needed to identify Census Bureau within block groups), US census block group boundaries, Thematic map layers Census Bureau's Block Groups contained within the study Wire Centers including: Average household income, Average days/week work at home, Average number of telephone lines (if available), Average commute distance to work or average number of days/weeks work at home (if available), Average educational attainment (if available),

Employment profile by job class (if available), Proportion of single and multi-family residences, DSL service profile for the equipment being deployed, Map of the Fiber network in these locations. This list is not exhaustive and there may be other information that may be useful in determining demand. Also, not all of the above information need be used to get an accurate forecast which is then used for optimal equipment deployment at minimal cost.

Claim 1 claims, in relevant parts, "determining a baseline architecture planning area having a tree structure", "determining a forecast of customer demand for digital subscriber line service ... using demographic data for said planning area", and "determining from said forecast the sites in said tree structure where the equipment is to be placed ...."

As noted above, the references, neither singly nor in combination, teach or even suggest a base architecture planning area having a tree structure and determining a forecast using geo-spatial demographic data and determining from said forecast the sites in the tree structure where the equipment is to be placed. Accordingly, it is respectfully submitted that Claim 1 should be deemed allowable over the art of record.

Claim 2 is a dependent claim, dependent upon Claim 1, providing the further limitation of placing the specific equipment identified and the numbers of such equipment at the sites determined in accordance with the method of Claim 1.

Claim 2 stands rejected because Wernli et al teaches determining placement of equipment and the number of equipment at locations. Claim 2 is a dependent claim dependent upon Claim 1. Wernli et al at column 5 line 28 to column 6 line 59 (cited by Examiner) describes a technique for determining paths according to a particular method. The method described in Wernli et al is different from the method claimed by Applicant in Claim 2 for the reasons set forth above with regard to Claim 1. Therefore, it is respectfully submitted that Claim 2 should be deemed allowable over the art of record.

Claim 3 stands rejected because of Applicants' admitted prior art that GIS is known. Claim 3 is a dependent claim dependent upon Claim 2. Applicants do not claim a geographic information system per se. Rather, Applicants in Claim 3 claim "accessing a geographic information system containing demographic information on the telecommunications subscribers within said geographic area." The accessed information is used in determining a forecast of customer demand. It is respectfully submitted that the combination of steps claimed in dependent Claim 3, including accessing a GIS, is not taught or even suggested in the art of record and hence, Claim 3 should be deemed allowable over the art of record.

Claim 4 stands rejected over Wernli et al and Applicants' admitted prior art. Claim 4 is a dependent claim dependent upon Claim 3. Claim 4 claims, in relevant part, the step of determining the boundary of said area based on data received from said geographic information system. Wernli et al completely fails to disclose or suggest determining the planning area based on data received from a GIS. Page 7 of the present application reads that "the GIS is a very useful visual aid that can be used and was used in our implementation to select the geographic area." "The information from the GIS database may be used to determine the boundaries of the selected geographic area." The cited references, neither singly nor in combination, disclose the step of determining the boundary of a planning area based on data received from a GIS for use in a method for determining placement sites for equipment within a geographic area in a telecommunications network as claimed in Claim 4. Therefore, it is respectfully submitted that Claim 4 should be deemed allowable over the art of record.

Claim 5 stands rejected as inherent and discussed in Wernli et al. Claim 5 is a dependent claim dependent upon Claim 3. Claim 5 claims the step of creating a network tree having a central office and cross-connects interconnected by cables and subscribers connected to cables. As noted above, Wernli et al fails to teach or even suggest creating a network tree. At page 3 of the Office Action the Examiner correctly noted that "Wernli et al is silent as to the network configuration." It is only after the teachings of the Applicants that one would consider a tree network. Such hindsight reconstruction of the claimed

invention is impermissible. Therefore, it is respectfully submitted that Claim 5 should be deemed allowable over the art of record.

Claim 6 stands rejected for the reasons of Claims 1 and 4 and that subscriber income is a standard or at least a notoriously old and well known parameter used when gathering demographic data. Claim 6 is a dependent claim dependent upon Claim 4. For the reasons set forth above the arguments for the rejection of Claims 1 and 4 are not valid. In addition, as the Examiner notes at page 4 of the Office Action, "Wernli et al does not teach the use of demographic data in determining future demand." Ufongene only considers cell area, building density and service penetration rate. The art of record fails to mention subscriber income as suggested by the Examiner. The use of subscriber income as data from a GIS used in a method for determining a forecast of customer demand for DSL service within a baseline architecture planning area for determining placement sites for equipment within a geographic area in a telecommunications network is neither taught nor suggested in the art of record and hence, Claim 6 should be deemed allowable over the art of record.

Claim 10 stands rejected for the reasons claims 1, 2 and 6 stand rejected and that normalizing cable length is inherent as a result of the configuration constraints discussed in Wernli et al. Claim 10 is a dependent claim dependent upon 4. Among the steps recited in Claim 10 is the step of "constructing a tree network connecting all said available sites." For the reasons set forth in regard to Claim 1 above, the art of record fails to disclose constructing a tree network in a method of determining the sites for equipment in a telecommunications network. It is respectfully submitted that Claim 10 should be deemed allowable over the art of record.

Claim 11 stands rejected for the reasons set forth with regard to claims 2 and 6. Claim 11 is a dependent claim, dependent upon Claim 10. Claim 11 claims the optimizing step [in Claim 10] is "based upon inputs including ... said tree network connecting all of the candidate equipment sites". The art of record fails to teach or even suggest the use of a

tree network connecting all of the candidate equipment sites as claimed by Applicants in Claim 11. Therefore, claim 11 should be deemed allowable.

The maximum allowable distance between a subscriber and its serving equipment location is a design constraint that must be satisfied. The constraint on length of copper to the DSLAM ensures that a customer receives sufficient signal strength and quality. (Page 13 at lines 21 and 22) The claimed invention provides an optimal solution of minimizing the cost of equipment deployment given a distance constraint (Page 13 at lines 15 to 20)

Claim 12 stands rejected for the reasons set forth in rejection of claims 10 and 11. Claim 12 is a dependent claim, dependent on claim 11. The distance constraint refers to the signal quality and the need for additional equipment. The claimed language "any two subscribers whose copper cables meet on their path to their serving equipment are served at the same equipment location" is something of a regularity constraint that results in a design which will be easier to maintain. (Page 14 at lines 5 to 7). The meeting of copper cables on their path to their serving equipment being served at the same equipment location in Claim 12 facilitates maintenance because the cables from different subscribers will travel the same path between the meeting location to a network node or to the central office. Subscribers in proximity may be served from the same central office. It is respectfully submitted that Claim 12 should be deemed allowable over the art of record.

Claims 13 to 19 are added by this amendment to claim a method for determining placement sites for equipment without the step of placing the specific equipment identified and the numbers of such equipment at the sites as set forth in Claim 2. The new claims are made dependent upon independent Claim 1 or on claims dependent, in turn, on Claim 1. It is respectfully submitted that Claims 13 to 19 should be deemed allowable for the reasons set forth above with regard to Claims 3 to 6 and 10 to 12.

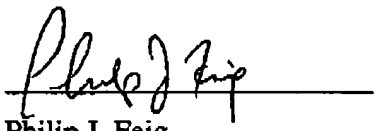
New Claims 20 to 30 claim the method for determining placement sites for equipment in conjunction with broadband service. The specification at page 3 line 24 to page 4 line2

reads "Although our method is described below in the context of DSLAM deployment, it is also generally applicable to deployment of the network equipment or architectures, e.g., Fiber To The Curb (FTTC) or other FTTx equipment or architectures." Page 9 lines 22 to 25 reads "A user can select any of these variable to estimate the proportion of households in a block that are likely to subscribe to DSL service or other broadband services."

It is respectfully submitted that Claims 20 to 30 should be deemed allowable over the art of record for the reasons set forth with respect to Claims 1 to 12.

Reexamination, reconsideration and favorable allowance of Claims 1 to 30 in the application are respectfully solicited.

Respectfully submitted,



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